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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Injection Nozzle for Filling Liquids under Pressure into Vessels

We, HAROLD LANGLEY HUNT, a British subject, of 35 Glenleigh Avenue, Bexhill-on Sea, Sussex, and WILLIAM VERNON MATTHEWS, a British subject, of Mayfield Court, Hollington Park Road, St. Leonards-on-Sea, Sussex, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to injection nozzles for filling liquids under pressure into vessels and particularly but not necessarily, into vessels which are themselves connected to a source of air pressure. In one example the liquid is lubricating oil which is ultimately used in the form of a finely atomised spray (so-called "micro-mist"), being delivered in such a form, as and when required, by means of a spraying device connected to a vessel, generally termed a bottle. The injection nozzle of the invention is particularly adapted to force a supply of oil in its liquid state through a non-return valve in a plug or stopper in the mouth of the bottle, the latter having a connection with a source of compressed air, and a discharge outlet through which oil is forced with a stream of compressed air in its atomised state.

According to the invention, an injection nozzle for filling liquids into vessels comprises a body constituting a handle having a duct there-through leading from a liquid entry for connection to a source of liquid supply under pressure, a first normally closed valve controlling the flow of liquid along the duct to a delivery head and hand-operated to open, and a second normally closed valve located in said delivery head in series with the first valve and capable of opening under liquid pressure so as to discharge liquid therefrom, said delivery head having a mouth complementary to a filler valve plug of a vessel to be filled so as to be temporarily attached thereto, the second normally closed valve located in the delivery head having a valve body movable in the head under

liquid pressure so as to form a liquid seal with said vessel valve plug before liquid is discharged through said valve in said head.

In order that the said invention may be readily understood an embodiment thereof will be described by way of example with the aid of the accompanying drawings, in which:

Figure 1 is an elevation of the embodiment partly in section;

Figure 2 is a sectional elevation of a valve plug, complementary to the injection nozzle of Figure 1, for fitting into a vessel to be filled by the nozzle; and

Figure 3 illustrates in section a modified form of valve for the delivery head of the injection nozzle.

Like reference numerals indicate the same or corresponding parts in the several views.

Referring to the drawings the injection nozzle is in the form of an elongated body 1 which can be conveniently gripped by an operator, and at one end of this body there is an entry at 2 for liquid under pressure. The entry is made in any suitable way for attachment thereto of a flexible pipe leading from a source of supply of bulk liquid under pressure. This liquid entry communicates through a suitable duct 3 with a delivery head 4 at the other end of the body 1 and this duct is interrupted by a first valve generally indicated at 5 which is normally closed under spring action. This first valve has a spindle 6 extending outside and underneath the body through a cylindrical passage in the body whereby it can be pressed upwards to open the valve by means of a hand lever 7 lying approximately parallel with the body 1 and hinged thereto at 8. The valve spindle 6 has a sealing engagement at 9 with the said cylindrical passage in the body. Thus, when the body 1 is gripped by the hand of the operator this hand lever 7 may be readily squeezed towards the body to open said first valve 5, and when released will allow the valve to close under the action of its spring and liquid pressure on the crown of the valve.

[Price 4s. 6d.]

The delivery head 4 is bored from underneath at 10 to form a delivery chamber 11 closed at the top and open at the bottom in which is mounted a valve body 12 capable of an axially slidable movement under liquid pressure limited in the direction of the delivery head mouth by a retaining ring 13 round the interior of the bore 10 in the delivery head engaging a step 14 on the lower extremity of the valve body 12.

The delivery head 4 is formed with a mouth which can partially encircle a filler valve plug or stopper projecting from the opening in the neck of a bottle or other container to be filled. The said mouth has an arcuate flange 16 which fits an annular groove 17 (Figure 2) around the periphery of the valve plug 18 so that the delivery head 4 can slide on the plug 18 and its flange 16 brought into engagement with the annular groove 17 whereby the mouth and the valve plug, being complementary to one another, are temporarily locked together.

The valve body 12 has a pair of co-acting valves whereby it cannot discharge unless the head is temporarily locked to the valve plug of the bottle as previously described. For this purpose there is a mushroom valve 21 the spindle 22 of which extends through the valve body 12 to a second mushroom valve 23 at the actual discharge opening 24 which can seat on a valve face round said discharge opening. By this arrangement the first mentioned mushroom valve 21 will open under liquid pressure against spring action and by such an opening movement would (without application of the delivery head 4 to the valve plug 18) only cause the second mushroom valve 23 to close and consequently no liquid could issue from the delivery head. However, so that it may act to feed liquid into the valve plug 18 of the bottle, the last mentioned mushroom valve 23 is provided with a depending stem 25 projecting with a suitable clearance through the opening in the valve seating which will prevent closure of the second mentioned mushroom valve 23 when the base of the valve body 12 contacts the valve plug 18 in the bottle to form a liquid seal therewith. Thus the stem 25 will encounter the valve plug 18 when liquid enters the delivery head 4 after the latter is temporarily affixed to the valve plug 18 so that both mushroom valves 21 and 23 are open to allow liquid to pass around the spindle into the bottle, pushing aside a non-return ball valve 20. The valve spindle 22 and the said stem 25 may be tubular with radial holes therethrough to allow liquid to pass via their interior into the opening of the valve plug 18.

Figure 3 shows a different form of valve construction for the delivery head 4. In this case the valve body 12 has its passage fitted with a normally closed ball valve 15 spring-pressed on to its seating. Thus when liquid under pressure is allowed to pass through the first valve 5 it arrives through the aforesaid

duct 3 into the top of the chamber 11 in the delivery head 4 and encounters the normally closed ball valve 15 therein. As a consequence when pressure liquid is introduced into the chamber 11 of the delivery head 4 it will first of all exert pressure on the valve body 12 to force this down on top of the valve plug 18 in the bottle and liquid seal it thereagainst by means of an O-ring 19 in the flat circular face of the valve body 12. When this pressure has been applied, the liquid then opens the ball valve 15 and allows liquid to discharge through the valve to the valve plug 18 of the bottle. This latter has a non-return ball valve 20 so that the liquid will then be forced through the same into the bottle.

#### WHAT WE CLAIM IS:—

1. An injection nozzle for filling liquids into vessels comprising a body constituting a handle having a duct therethrough leading from a liquid entry for connection to a source of liquid supply under pressure, a first normally closed valve controlling the flow of liquid along the duct to a delivery head and hand-operated to open, and a second normally closed valve located in said delivery head in series with the first valve and capable of opening under liquid pressure so as to discharge liquid therefrom, said delivery head having a mouth complementary to a filler valve plug of a vessel to be filled so as to be temporarily attached thereto, the second normally closed valve located in the delivery head having a valve body movable in the head under liquid pressure so as to form a liquid seal with said vessel valve plug before liquid is discharged through said valve in said head.

2. Injection nozzle according to claim 1 in which the mouth of the delivery head is made with an arcuate flange to fit an annular groove around the periphery of the filler valve plug to which the head is adapted to be fitted.

3. Injection nozzle according to claim 1 in which the delivery head is formed with a delivery chamber closed at the top and open at the bottom having mounted and axially slidable therein the valve body of the said second normally closed valve, the movement of said valve body being limited in the direction of the delivery head mouth, said valve body having a passage therethrough containing the said second normally closed valve capable of being opened by the introduction of liquid into the top of the delivery chamber.

4. Injection nozzle according to claim 3 in which the second normally closed valve which is located in the delivery head is a first mushroom valve on the spindle of which there is a second mushroom valve capable of sealing off the passage through the slidable valve body when the first mushroom valve is opened, said second mushroom valve having a stem capable of projecting out of the passage for engagement with the filler valve plug of a bottle to be filled so as to engage the latter

and open the said second mushroom valve, the first mushroom valve (i.e. the said second normally closed valve) remaining open.

- 5 An injection nozzle for filling liquids into vessels constructed and operating substantially as herein described and as illustrated in the accompanying drawings.

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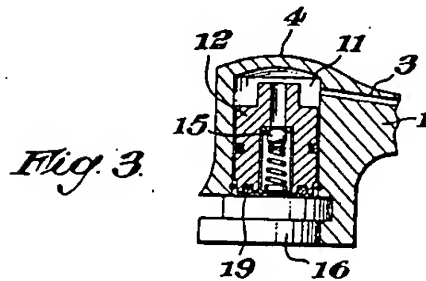
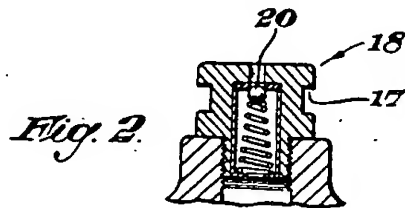
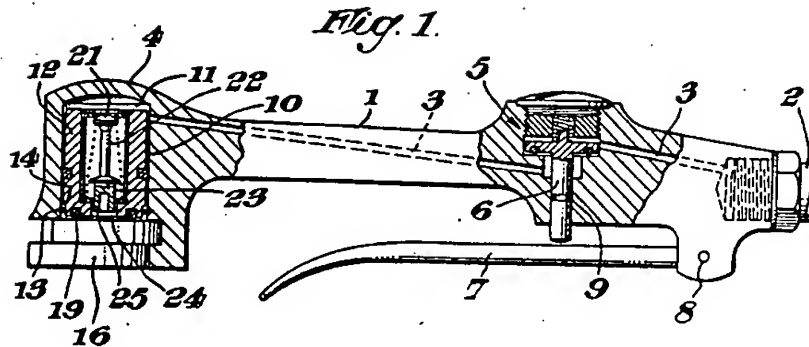
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COMPLETE SPECIFICATION

1 SHEET

This drawing is a reproduction of the Original on a reduced scale.



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